diagnostics

MDPI

Article

Positive Predictive Value of Panoramic Radiography for Assessment of the Relationship of Impacted Mandibular Third Molars with the Mandibular Canal Based on Cone-Beam Computed Tomography: A Cross-Sectional Study

Maryam Tofangchiha [1], Soheil Koushaei [2], Maryam Mortazavi [3], Zahra Souri [3], Ahad Alizadeh [4,*] and Romeo Patini [5]

1 Department of Oral and Maxillofacial Radiology, Dental Caries Prevention Research Center, Qazvin University of Medical Sciences, Qazvin 34199-15315, Iran; mt_tofangchiha@yahoo.com
2 Department of Oral and Maxillofacial Surgery, Dental Faculty, Qazvin University of Medical Sciences, Qazvin 34199-15315, Iran; Drkoushaei@yahoo.com
3 Student Research Committee, Qazvin University of Medical Sciences, Qazvin 34199-15315, Iran; maryam_mortazavi85@yahoo.com (M.M.); matinsouri137265@gmail.com (Z.S.)
4 Medical Microbiology Research Center, Qazvin University of Medical Sciences, Qazvin 34199-15315, Iran
5 Department of Head, Neck and Sense Organs, School of Dentistry, Catholic University of Sacred Heart, 00135 Rome, Italy; romeo.patini@unicatt.it
* Correspondence: st.alizadeh@gmail.com

Citation: Tofangchiha, M.; Koushaei, S.; Mortazavi, M.; Souri, Z.; Alizadeh, A.; Patini, R. Positive Predictive Value of Panoramic Radiography for Assessment of the Relationship of Impacted Mandibular Third Molars with the Mandibular Canal Based on Cone-Beam Computed Tomography: A Cross-Sectional Study. *Diagnostics* **2021**, *11*, 1578. https://doi.org/10.3390/diagnostics11091578

Academic Editor: Luca Testarelli

Received: 7 July 2021
Accepted: 11 August 2021
Published: 31 August 2021

Publisher's Note: MDPI stays neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Abstract: The aim of the present study was to assess the positive predictive value (PPV) of panoramic radiographic signs in the assessment of the relationship between impacted mandibular third molars (IMTMs) and the mandibular canal (MC). This cross-sectional study was conducted by reviewing 102 cone-beam computed tomography (CBCT) and panoramic radiographs of patients with IMTMs and radiographic signs of the contact of the IMTMs with the MC on panoramic radiographs (i.e., root apex darkening and interference with the white line). A positive relationship of the IMTM roots with the MC based on CBCT findings was recorded as the gold standard. The PPV of panoramic radiographic signs was calculated for the detection of the relationship of the IMTM root with the MC. The IMTMs were in contact with the MC on CBCT scans in 90.1% of the cases. The PPV of root apex darkening and the interference with the white line was found to be 89.09% (95% CI: (77.75, 95.88)) and 91.48% (95% CI: (79.62, 97.63)), respectively. The MC had a buccal position in 63.7%, and a lingual position in 35.2%, of the cases. The contact of IMTMs with the MC was more commonly seen in patients with a lingual position (100% of the samples). The IMTM root apex darkening and interference with the white line of the MC on panoramic radiographs had a high PPV for determination of the contact of IMTMs with the MC. Thus, presence of the above-mentioned risk factors indicates the need for subsequent 3D radiographic assessments.

Keywords: radiography; panoramic; molar; third; cone-beam computed tomography

1. Introduction

Extraction of impacted mandibular third molars (IMTMs) is among the most common oral surgical procedures performed by dental clinicians and oral and maxillofacial surgeons [1]. However, the extraction of IMTMs can cause dysesthesia of the inferior alveolar nerve (IAN), which is a serious postoperative complication [1,2]. The proximity of the mandibular canal (MC) to the IMTM root is the most important factor responsible for IAN damage. Dental radiography is a suggested diagnostic modality to prevent such complications [2]. Radiography can provide valuable information regarding the size, shape, and branching of the MC; orientation of the IMTM root (s); proximity to the adjacent anatomical structures; and complications related to third molar impaction [3]. Therefore, preoperative